IOT - Based Smart Streetlight for Safety

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Abstract:

In this study, we introduce an IOT -based intelligent streetlight system designed to improve safety in urban areas. This system utilizes audio-based event detection via Edge Impulse's machine learning platform and is implemented on the Arduino nano BLE 33 Sense board, which includes a built-in microphone for capturing audio in real-time. Our model is trained to identify distress signals like the word "Help," triggering visual alerts (such as flashing streetlights) to draw attention and potentially notify authorities. This real-time, low-power solution operates locally, ensuring a swift response without the need for constant cloud connectivity. We outline the entire process—from data collection and model training to hardware integration and deployment—and showcase its effectiveness through practical simulations.

Keywords:

Edge Impulse, Arduino nano BLE 33, Safety, IOT , Smart Streetlight, Machine Learning, Audio Classification, Embedded Systems.